

CLAIMS

1. Hydrogen reservoir comprising a substance suitable for storing hydrogen characterised in that said substance is made up of nano-structured silicon.

5        2. Hydrogen reservoir as claimed in claim 1 characterised in that said substance is made up of meso-porous and/or nano-porous silicon nanostructures.

3. Hydrogen reservoir as claimed in one of claims  
10 1 or 2 characterised in that said substance is made up of nano-structured silicon, porous and compacted.

4. Hydrogen reservoir as claimed in one of claims  
1 or 2 characterised in that said substance is made up  
15 of nano-structured silicon, porous, ground and compacted.

5. Manufacturing process for a hydrogen reservoir characterised in that it consists in porosifying  
20 silicon in order to produce meso-porous and/or nano-porous silicon nano-structures and to store hydrogen in them by creating chemical bonds between the hydrogen and the silicon.

25        6. Manufacturing process as claimed in claim 5 characterised in that the creation of the chemical bonds between the hydrogen and the silicon is obtained through action of an acid.

7. Manufacturing process as claimed in claim 5 characterised in that it consists in subjecting monocrystalline, polycrystalline or amorphous silicon to an electrochemical anodisation implementing an acid and making it possible to simultaneously obtain the porosification of the silicon and the storage of the hydrogen.

8. Process as claimed in claim 7 characterised in that the acid implemented is hydrofluoric acid.

9. Process as claimed in any of claims 5 to 8 characterised in that it further comprises a subsequent step consisting in compacting the nano-structured silicon.

10. Process as claimed in claim 9 characterised in that it further comprises, before the compaction step, a step for grinding of the nano-structured silicon.

11. Method for use of a hydrogen reservoir as claimed in any of claims 1 to 4 characterised in that the hydrogen being stored in the reservoir, the method includes a step consisting in bringing about the breakage of the chemical bonds between the hydrogen and the silicon in order to extract the hydrogen.

12. Method for use as claimed in claim 11 characterised in that the breakage of the chemical bonds between the hydrogen and the silicon is brought about by an input of energy chosen from among chemical

energy, thermal energy, mechanical energy, radiant energy and the energy of an electric field.

13. Method for use as claimed in one of claims 11  
5 or 12 characterised in that it includes a step for recharging the reservoir consisting in putting said substance in contact with an acid.

14. Fuel cell system or fuel cell including a  
10 hydrogen reservoir as claimed in any of claims 1 to 4.

15. Hydrogen motor system or hydrogen motor including a hydrogen reservoir as claimed in any of claims 1 to 4.